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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/560,158	12/09/2005	Arvydas Antanas Maldziunas	1876.009US1	9503
7590	04/02/2007		EXAMINER	
Timothy B. Clise Schweman Lundberg Woessner & Kluth P O Box 2938 Minneapolis, MN 55402			BUI PHO, PASCAL M	
			ART UNIT	PAPER NUMBER
			2878	
SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE		
3 MONTHS	04/02/2007	PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

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Office Action Summary	Application No.	Applicant(s)	
	10/560,158	MALDZIUNAS, ARVYDAS ANTANAS	
	Examiner Pascal M. Bui-Pho	Art Unit 2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on _____.
- 2a) This action is **FINAL**. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) 17-21 is/are allowed.
- 6) Claim(s) 1-16 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 09 December 2005 is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date. _____
3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>6/6/06;3/6/06;12/9/05</u> .	5) <input type="checkbox"/> Notice of Informal Patent Application
	6) <input type="checkbox"/> Other: _____

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Oath/Declaration

2. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because the Filing Date of Prior Application 0301857-9 filed in Sweden has not been properly identified. The Filing Date of the Prior Application should be changed to 24 June 2003.

Specification

3. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.
4. The disclosure is objected to because of the following informalities: no description has been provided for Figure 3; on Page 7, lines 13 and 18, reference number “9” has been used to refer both a flange and an outer wall.

Appropriate correction is required.

Drawings

5. Figures 1-3 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled “Replacement Sheet” in the page header (as per 37

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CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

6. New corrected drawings for Figures 1-3, 5, 8, 9, 11, and 14, in compliance with 37 CFR 1.121(d), are required in this application because of insufficient quality. Applicant is reminded that no handwritten and/or hand-drawn figures/reference numbers should be submitted. Applicant is advised to employ the services of a competent patent draftsperson outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

Claim Objections

7. Claims 4, 6, 7, and 14 are objected to because of the following informalities:

With regards to claim 4, on line 2, “according to claim 1 the shading elements” should be changed to --according to claim 1, wherein--.

With regards to claim 6, on lines 1-2, “claim 5” should be changed to --claim 5, wherein--.

With regards to claim 7, on lines 1-2, “claim 6” should be changed to --claim 6, wherein--.

With regards to claim 14, on lines 1-2, “claim 12” should be changed to --claim 12, wherein--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

8. Claims 5-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 5 recites the limitation "said chamber" in each respective line 3. There is insufficient antecedent basis for this limitation in the respective claims.

Claims 6-8 are also rejected under 35 U.S.C. 112, second paragraph, because they inherit the indefiniteness from the claim(s) they depend upon.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 1-9, 11, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hill et al. (US 6,084,228) in view of Kato et al. (US 5,553,775).

With regards to claims 1, 2, 5, and 15, Hill et al. disclose in Figs. 1-4 a photo radiation intensity directional sensor (10) comprising a housing (40) having a transparent or translucent portion (70) and a printed circuit board (20) placed in such way in the housing that one of its edges faces the transparent or translucent portion, at least a sensing element (21) sensitive to visible radiation is placed at a first side of the printed circuit board, at least a third sensing element (22) sensitive to visible radiation is placed at a second side of the printed circuit board, where said sensing elements are arranged to detect both the direction and the intensity of the

radiation source (sun) and for producing output signals which are used for estimating the sun radiation heating impact (Column 5, lines 21-47), and where the printed circuit board is arranged in such a way that it functions as a shading element between the areas on its first and second side where in the sensing elements are mounted (generally depicted in Fig. 4). Hill et al. however remain silent with regards to a second and fourth sensing element placed at a first and second side of the printed circuit board, respectively, and said first and second sensing elements and said third and fourth sensing elements being separated by a first and second flange serving as a shading element, respectively, in order to divide a chamber into sub-compartments with one or several sensing elements. In an analogous sensing art, Kato et al. disclose in Fig. 3 a photo radiation intensity directional sensor (72) comprising, among other features, a first and second sensing element (68, 70) separated by a flange (78), wherein the sensing elements are used to estimate the sun radiation heating impact. It is herein considered that the inclusion of said flange (78) would create sub compartments, each containing one sensing element. Selecting a known available configuration of sensors to detect sunlight would have been obvious. Hence, at the time of the invention, it would have been obvious to modify the sensing element disclosed by Hill et al. and including the sensor configuration taught by Kato et al., in order to provide improved sensing of the solar radiation.

With regards to claims 3 and 9, Hill et al. disclose a photo radiation intensity directional sensor (10) wherein the housing (40) comprises a chamber containing a diffuse compound (50) that is a potting, which compound is positioned between said housing and at least one of the sensing elements (21, 22) and wherein said sensing elements are positioned inside said chamber and being exposed to said diffusive compound.

With regards to claim 4, Hill et al. disclose a photo radiation intensity directional sensor (10) comprising sensing elements (21, 22) and a printed circuit board (20) functioning as a second shading element, but lack a clear disclosure of a first shading element separating the sensing elements to a degree depending on the position of the photo radiation intensity directional sensor in relation to a source of photo radiation. As explained above, the inclusion of a sensor configuration with sensing elements separated by a shading element (78 of Kato et al.) would have been obvious. Hill et al. however further lack a clear disclosure of creating differences in output amplitudes from the sensing elements, which difference in amplitude is used for estimating the position of the source of radiation. Kato et al., in Fig. 8, disclose a photo radiation intensity directional sensor comprising sensing elements (68, 70) and a shading element (78) wherein the shading element is arranged for creating differences in output amplitudes from the sensing elements, which difference (ΔQ_{SUN}) in amplitude is used for estimating the position of the source of radiation (Column 5, lines 9-21). One of ordinary skill in the art would recognize that a sun light incident angle and insolation magnitude are proportional to an estimation of the sun's position and intensity, respectively. Hence, at the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Hill et al. by creating differences in output amplitudes from the sensing elements, and using the difference in amplitude to estimate the position of the source of radiation, as taught by Kato et al., in order to provide more reliable sensing results.

With regards to claims 6-8, Hill et al. and Kato et al. disclose a photo radiation intensity directional sensor (10 of Hill et al.) wherein the chamber includes a top region (60 of Hill et al.) and a bottom region (generally depicted in Fig. 3) where said top and bottom regions are

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vertically arranged above and below, respectively, said shading elements (20 of Hill et al. and 78 of Kato et al.) such that said shading elements do not prevent photo radiation from impinging on at least a portion of each sub compartment in said top region.

With regards to claim 11, Hill et al. disclose a photo radiation intensity directional sensor (10) wherein the printed circuit board (20) carries further electronic circuits (25, 26) and is positioned at least partly inside said chamber such that said electronic circuits and said sensing elements (21, 22) are protected from negative influence on the environment by the diffuse compound (Column 3, lines 3-16).

11. Claims 10 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hill et al. (US 6,084,228) in view of Kato et al. (US 5,553,775), further in view of Ackerman et al. (US 5,022,930).

With regards to claims 10 and 16, Hill et al. and Kato et al. disclose in Figs. 1-4 (Hill et al.) a photo radiation intensity directional sensor comprising a diffusing compound (50 of Hill et al.) arranged to preserve sensing elements (21, 22 of Hill et al.), but lack a clear disclosure that said compound preserves said elements from oxidizing. In an analogous sensing art, Ackerman et al. disclose in Figs. 1 and 3 a photo radiation intensity sensor comprising a gel or a liquid (58) arranged to preserve sensing elements (14). Selecting a known available compound to protect sensing elements is known in the art. Hence, at the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Hill et al. and Kato et al. by utilizing a compound that preserves sensing elements from oxidizing, as taught by Ackerman et al., in order to increase the useful life of the device (Column 2, lines 65-68).

12. Claims 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hill et al. (US 6,084,228) in view of Kato et al. (US 5,553,775), further in view of Maruko et al. (US 4,362,931).

With regards to claims 12-14, Hill et al. and Kato et al. disclose in Figs. 1-4 (Hill et al.) a photo radiation intensity directional sensor comprising a diffusing compound (50 of Hill et al.) and sensing elements (21, 22 of Hill et al.), but lack a clear disclosure of said compound being a radiation filter transparent to a defined frequency interval and arranged to block radiation outside said frequency interval from impinging on said sensing elements. In an analogous sensing art, Maruko et al. disclose in Fig. 1 a sensor comprising, among other features, a diffusing compound (4) and sensing elements (10, 10') wherein said compound is a lens that filters radiation by transmitting (hence transparent) radiation of a defined frequency interval and arranged to block radiation outside said frequency interval from impinging on said sensing elements. Selecting a notoriously known optic to filter unwanted light would have been obvious to one of ordinary skill in the art. Hence, at the time of the invention, it would have been obvious to modify Hill et al. and Kato et al. by including a filtering compound, as taught by Maruko et al. in order to provide more reliable sensing outputs.

Allowable Subject Matter

13. Claims 17-21 are allowed over prior arts.

14. The following is a statement of reasons for the indication of allowable subject matter:

With regards to claim 17, the prior arts of record fail to anticipate and/or render obvious, either solely or in combination, a photo radiation directional intensity sensor calibration method comprising, among other steps, rotating the sensor 360° in azimuth and from 0° to 90° in

elevation under a fixed light source, which rotation takes place in predetermined steps; measuring all the azimuth steps for each elevation steps, where each measurement results in a value from each sensing element that is part of the sensor.

With regards to claim 19, the prior arts of record fail to anticipate and/or render obvious, either solely or in combination, a photo radiation directional intensity sensor measuring method, comprising, among other steps, calculating an average value of a signal acquired from sensing elements, which average value is proportional to the intensity of the detected radiation; calculating differences between output signals of opposing elements; calculating normalized values p and q of the above differences by dividing them with the average value; calculating a first azimuth angle value $A_z = C_1 \arctan(p/q)$, where C_1 is a constant; calculating a corrected azimuth angle value, using the calculated first azimuth value A_z and using comparison with correction coefficients; calculating a first elevation angle value $E = C_2 \sqrt{p^2 + q^2}$ where C_2 is a constant; calculating a corrected elevation angle value, using the calculated first elevation angle value E and using comparison with correction coefficients; calculating a first intensity value $I = C_3 * \text{the average value}$, where C_3 is a constant; and calculating a corrected intensity value, using the calculated first intensity value E and using comparison with correction coefficients.

Claims 18, 20, and 21 are allowed at least on the basis of their dependency upon an allowable base claim(s).

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- I) Voss (US 6,031,177) discloses a photovoltaic power source including a shadowing

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timer comprising at least one shadowing member secured proximal to an array of photovoltaic solar cells.

- II) Sumiya (US 6,781,106) discloses a solar sensor comprising a housing, a pair of optical devices, an optical lens and a lens member.
- III) Carlton (US 4,297,572) discloses a solar energy collector assembly of the tracking type and includes a solar panel mounted for movement along a predetermined tracking path in order to maintain a predetermined orientation with respect to the sun.
- IV) Hammons (US 4,225,781) discloses a solar tracking device which tracks the position of the sun using paired, partially shaded photocells.
- V) Takahashi (US 5,153,429) discloses a solar radiation sensor including a filter provided on an upper surface of the case and a photodetector disposed for detecting the quantity of solar radiation coming through the filter.
- VI) Osawa (US 5,072,105) discloses a solar radiation detecting device for an automobile air-conditioner including a left solar radiation sensor, a right solar radiation sensor and a horizontal solar radiation sensor so that an incident direction, altitude and intensity of the sunlight are calculated.
- VII) Rotolo (US 4,361,758) discloses a sun position sensor including a plurality of solar sensors sensing solar energy arriving in a respective azimuth and elevational direction.

Telephone/Fax Information

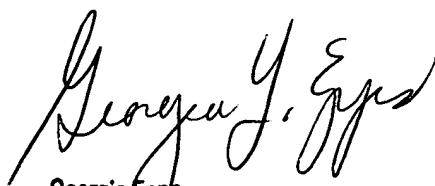
16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pascal M. Bui-Pho whose telephone number is (571) 272-2714. The examiner can normally be reached on Monday through Friday: 8:30 a.m. - 5:00 p.m.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on (571) 272-2328. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Pascal M. Bui-Pho
Examiner, Art Unit 2878
23 March 2007



Georgia Epps
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